

REMARKS

Favorable reconsideration of this application is respectfully requested.

Claims 1, 4, 14-21, 23, 24, 28-35, 40-42, 44-46, 49-52, and 54-85 are pending in this application. Claim 6 is canceled by the present response without prejudice. Claims 14, 15, 23, 46, 50, 58, 73, 74, and 85 were rejected under 35 U.S.C. § 102(e) as anticipated by U.S. patent 6,163,365 to Takahashi. Claims 19-21, 29, 30-33, 44, 45, 52, 56, 57, 62, 63, 66, 67, 83, and 84 were rejected under 35 U.S.C. § 102(e) as anticipated by U.S. patent 5,721,608 to Taniguchi. Claims 1, 4-6, 16-18, 24, 34, 35, 40-42, 49, 51, 54, 55, 59, 60, 61, 69, 70, 72, 77, and 78-82 were rejected under 35 U.S.C. § 103(a) as unpatentable over Takahashi. Claims 28, 64, 65, 68, 71, 75, and 76 were objected to as dependent upon rejected base claims, but were noted as allowable if rewritten in independent form to include all of the limitations of their base claim and any intervening claims.

Initially, applicants gratefully acknowledge the above-noted indication of allowable subject matter.

Addressing the above-noted rejections, each of the above-noted rejections is traversed by the present response as each of the currently pending claims is believed to distinguish over the teachings in Takahashi and Taniguchi.

Takahashi describes a structure in which an output of a detector 10 and an output of an illuminometer 11 are detected, a ratio between the outputs are calculated, and a transmissivity of an imaging lens 7 and a transmissivity of a projection optical system 8 are measured. Takahashi describes a structure in which in a state that an exposure apparatus is under operation, a value of transmissivity of a system including condensing lens 7 and projection optical system 8 is predicted in accordance with an integrated light quantity per unit time as monitored through the detector 10, and with values of an aperture area of a masking blade 6 and a transmissivity of a reticle R. Further, in a state in which the exposure

apparatus is left without light irradiation a transmissivity of the system including the condenser lens 7 and projection optical system 8 is predicted from the transmissivity just before the apparatus is left and from the time in which the apparatus has been left. If, during a non-operation in Takahashi, the value of transmissivity becomes lower than a predetermined threshold value, the system is irradiated with laser until the transmissivity of the system increases to the predetermined level.

Taniguchi describes a system in which incident energy of illumination light that is incident on a projection optical system from a reticle side is obtained in accordance with a positional relationship between a reticle and a slit-like illumination area. Further, in Taniguchi an imaging characteristic of the projection optical system is corrected based on incident energy that varies depending on the positional relationship between the reticle and the slit-like illumination area.

In this structure, in Taniguchi to obtain a reticle transmittance for each scan position of the reticle, a magnitude of an output Sc_1 from a radiation sensor 41 is sequentially read in correspondence with the coordinate position of a reticle interferometer, and similarly a magnitude of an output Sa from a photoelectric sensor 28 is read. A ratio Sc_1/Sa is then calculated and stored in a memory. The storage of such data in the memory is performed at intervals corresponding to a predetermined moving amount with reference to the resolving power of a reticle interferometer (i.e. at position intervals or time intervals at which no problem is posed in terms of an error in the calculation precision of a variation of magnification). Also, Taniguchi describes a structure in which information regarding variation characteristics of imaging characteristics must be replaced every time the illumination condition is changed upon replacement of an aperture stop 29.

However, both the teachings in Takahashi and Taniguchi differ from the claims as currently written.

First, with respect to independent claims 1, 14, 24, 42, and 46, and the claims dependent therefrom, each of those claims is amended by the present response to clarify features therein. For example, claim 1 now recites “a time interval for transmittance measurement is changed in consideration of a transmittance of an optical system that changes depending on a set exposure condition”; the other noted independent claims 14, 24, 42, and 46, now also require similar limitations. Neither Takahashi nor Taniguchi teach or suggest such a feature. Takahashi does describe a structure in which a transmissivity is predicted, but does not describe or suggest a structure such that a time interval for transmittance measurement is changed in consideration of a transmittance of an optical system, as in the noted claims.

Further, with respect to independent claims 16 and 44, those claims are also amended by the present response to clarify features recited therein. With respect to those claims neither Takahashi nor Taniguchi describe or suggest a structure such that an amount of exposure light obtained by a first measurement and an amount of exposure light obtained by a second measurement are compared, and such that a time interval for measurement for measuring an amount of exposure light is obtained based on the comparison result. Thus, independent claims 16 and 44, and the claims dependent therefrom, also distinguish over the applied art.

With respect to independent claim 29, claim 29 is amended by the present response to clarify features recited therein, and that are believed to distinguish over Takahashi and Taniguchi. More specifically, neither Takahashi nor Taniguchi describe or suggest a structure such that a transmittance obtained by a most recent measurement and a transmittance obtained by a measurement performed before the most recent measurement are compared, and further such that a control unit sets a time interval for measurement for measuring a transmittance of the optical system based on the comparison result. Thus,

independent claim 29, and the claims dependent therefrom, also distinguish over the applied art.

With respect to independent claims 19 and 45, those claims are unamended but are believed to also distinguish over the applied art.

More specifically, neither Takahashi nor Taniguchi describe or suggest a structure such that a time-varying prediction function is determined in consideration of a predetermined condition in which a self-cleaning is performed.

Takahashi does describe a structure such that laser 1 is emitted until a transmissivity of a system including condensing lens 7 and projection optical system 8 increases to a predetermined level. However, Takahashi does not describe or suggest that a time-varying prediction function is determined in consideration of a light quantity of the laser 1 emitted to increase transmissivity.

Thus, independent claims 19 and 45, and the claims dependent therefrom, are also believed to define over the applied art.

In view of these foregoing comments, it is respectfully submitted that each of the pending claims distinguishes over the previously applied art to Takahashi and Taniguchi.

As no other issues are pending in this application, it is respectfully submitted that the present application is now in condition for allowance, and it is hereby respectfully requested that this case be passed to issue.

Respectfully submitted,

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